

JUST
FOR
TEACHERS

Forests

The *FORESTS* magazine is designed for third and fourth grade students. This teacher guide provides you with additional information to discuss and teach about healthy Missouri forests. Vocabulary, student objectives and pre- and post-discussion questions are included to help get students thinking.

Look for new words and terms from the student magazine highlighted in **bold** letters and additional important terms in ***italic bold*** letters.

Trees Are a Renewable Resource

SHOW-ME STANDARDS

Performance: 1.5, 1.6, 2.3

Knowledge: CA3, CA6, SC3, SC4, SC8, SS5

VOCABULARY forest, urban, rural, renewable resource

STUDENT OBJECTIVES Students will be able to:

1. Define a forest.
2. Compare and contrast Missouri forests and rainforests.
3. Describe why Missouri forests are renewable resources.

PRE-DISCUSSION QUESTIONS

1. What do you think of when you hear the word forest?
2. Where do you find forests?
3. What is a renewable resource?

Forests in the Neighborhood

You don't have to travel far to see wonderful **forests**. Look around your neighborhood to find a forest. What are the plants and animals living there?

Missouri's hardwood forests are one of many kinds of forests in the United States and around the world. They are considered **temperate** forests (see map on page 2). Temperate forests stretch across the middle of the United States. Most of Missouri's trees are **deciduous**; they lose their broad leaves each fall. Oak and hickory are the main trees in our forests.

Missouri's temperate forests have soils rich in nutrients from decaying leaves. Rainforests, in comparison, have their nutrients in the **canopy**. When a rainforest is cut, the nutrients needed to grow a new forest are gone. When a Missouri forest is cut, the rich soils support new trees and the forest grows back quickly. It is a **renewable resource**.

(continued on page 2)



Healthy Trees Make Healthy Forests

SHOW-ME STANDARDS

Performance: 1.5, 2.1, 2.3, 4.6

Knowledge: CA1, FA1, SC3, SC4

VOCABULARY root, trunk, bark, crown, photosynthesis, habitat, harvest

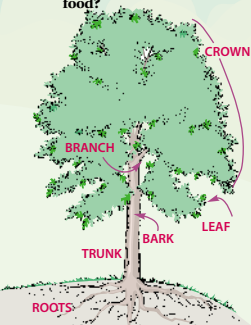
STUDENT OBJECTIVES

Students will be able to:

1. List the main parts of a tree.
2. Understand that the tree produces its own food.

PRE-DISCUSSION QUESTIONS

1. How many of you have been hiking in a forest?
2. How are trees different than animals?
3. How does a tree get its food?



Always Standing Still

One of the big differences between plants and animals is that plants can't move to find their food. They must depend on the spot where they are growing to provide everything they need to make food, grow, flower and produce seed.

Trees have developed specialized parts to collect water, minerals and carbon dioxide and convert them to food. From the **roots** deep in the soil to the leaves high above the ground, each part plays an important role in helping a tree grow.

A tree's roots help anchor the tree in the ground. They also absorb water and minerals from the soil. The roots are connected to the tree's leaves. The **trunk** and branches contain the tree's pipes or the tubes that transport water and minerals from the roots to the leaves and food from the leaves to the rest of the tree. The **bark** protects the trunk from injury caused by insects, animals, disease and fire.

Leaves are the food factory of the tree. Using energy from sunlight, leaves convert carbon dioxide, minerals and water into oxygen and sugar (food) through a process called **photosynthesis**. The leaves and branches make up the **crown** of the tree. The canopy is the forest layer formed by the leaves and branches.

The careful **harvest** of trees gives us the wood products we need each day. Harvesting removes mature trees for use as lumber and paper. Harvesting also provides growing space for the next generation of trees. Regulated harvesting is actually beneficial to the forest and provides a variety of ages and sizes of trees that are homes or **habitat** for a diversity of wildlife.

(continued from page 1)

Even Missouri's cities and **urban** areas have forests. Urban forests may not be as thick, but they are still important ecosystems with a variety of plants and animals. Both urban and **rural** residents find exciting forest life near their back doors.

POST-DISCUSSION QUESTIONS

1. **What is a forest?** *an area of land covered with trees, other plants and animals, as well as soil, water and air*
2. **Where is our closest forest?** *look for nearby parks, conservation areas or land with trees near school*
3. **How are Missouri forests different from rainforests?** *when rainforests are cut, the nutrients needed to regrow a forest are gone; Missouri forests have rich soils to support new trees and grow back quickly*



ACTIVITY

After this section, ask students to collect from the schoolyard or bring from home one or more different parts of a tree they find on the ground. They may find acorns, seeds, fallen leaves, twigs, flowers or pieces of bark.

1. On a large piece of newspaper or poster board, draw an outline of a tree. Show its roots, trunk, branches and crown.
2. Have the students paste the tree parts they found in the proper location of the tree outline. You may want to use pieces of yarn for the roots.
3. Review by having students help you label the parts of the tree.

POST-DISCUSSION QUESTIONS

1. **Name the main parts of a tree.**
root, trunk, bark, branch, leaf, crown
2. **How are plants different from animals in the way they gather food?** *plants can't move to find food*
3. **What do trees need to produce food?** *sunlight, carbon dioxide, water, minerals*

4. **Why are Missouri forests renewable resources?** *because they grow back*
5. **What do you think makes a healthy forest?** *(discussion leading to the next section)*

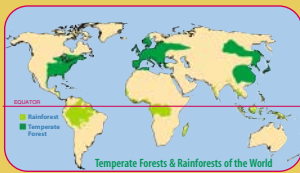


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Moving Along

SOWING TREE SEEDS

SHOW-ME STANDARDS Performance: 1.2, 2.1, 4.1
Knowledge: CA1, FA1, SC3, SC4

VOCABULARY seedling, fruit

STUDENT OBJECTIVES Students will be able to:

1. List three factors a tree seed needs to grow into a seedling.
2. Discuss the importance of a seed's movement away from a parent tree.
3. Compare and contrast the appearances of plant seeds as they affect seed distribution.

PRE-DISCUSSION QUESTIONS

1. What trees have seeds?
2. Are there different kinds of seeds?
3. Could a seed become a tree if it grew under the parent tree?

Flyers, Floaters, Planters and Poopers

Trees reproduce by making seeds. Each seed's design is adapted for a particular purpose. Young trees, or **seedlings**, need water, good soil and light for them to grow into healthy trees. If seeds fall straight down in the parent tree's shade, they do not get enough light to grow quickly. Seeds need **fruits** to help them move away from parent trees. Nuts and

berries are fruits because they contain seeds. Fruits that are light and blow away from trees are flyers. Some have a wing to help them fly. Maple and pine trees are flyers.

Lightweight seeds float and usually come from trees growing near water. The fruits land in water and float to the shallow edges where they start growing. Baldcypress and sycamore are floaters.

Heavy fruits that fall close to the tree are carried away and planted by animals such as squirrels. The animals bury or stash the seeds for winter food. If the animals do not eat them, the seeds start growing. Walnuts, hickory nuts and oak acorns are planters.

The fruits that animals love to eat have adapted so that the seed covering gets digested in the animal's stomach. Later, the animal poops out the seed far from the tree. Dogwoods, cedars, persimmons and mulberries are poopers.

See the activity sheet, "Silly Seeds," on page 6. Make copies for students and ask them to complete the activity. Discuss the answers, seed dispersal and their new seed designs.

POST-DISCUSSION QUESTIONS

1. Which fruits here look like they could fly?

maple, pine **Could float?** baldcypress, sycamore **Are tasty to store for winter?** pecan, oak **Are juicy to eat right now?** mulberry, persimmon

2. Why is it important for seeds to move away from the parent tree?

because they need more sunlight, water and rich soil than they would get under a big tree

History & Tall Trees

SHOW-ME STANDARDS

Performance: 1.1, 1.5, 1.6, 3.1, 3.2, 3.7, 4.1
Knowledge: CA3, SS2, SS5, SS7, SC4, SC8

VOCABULARY conservation

STUDENT OBJECTIVES

Students will be able to:

1. Compare and contrast today's forests with those of 150 years ago.
2. List three historic uses of forest products that helped the settlement of Missouri.
3. Briefly describe how forests are managed for harvest today.

PRE-DISCUSSION QUESTIONS

1. What do Missouri forests look like today?
2. What do you think Missouri looked like in the past?

Built on Trees

Two hundred years ago, a traveler in our region would have encountered a vast system of diverse forests. Except for the grasslands of northern and western Missouri, much of our state was covered in trees.

The forests in the lowlands of southeastern Missouri and in the bottomlands along the big rivers had enormous oaks and hickories. Some trees were 130 feet tall with trunk diameters of 7 feet or more.

Forests on Ozark hills were dry with smaller trees growing in rocky soils. The trees were also more scattered, allowing prairie grasses and wildflowers to grow beneath them. Northern and western Missouri forests were scattered and smaller, surrounded by grasslands or prairie.

Today only 30 percent of our state is forested. Most of these forests have regrown after a period of dramatic use. Heavy logging occurred after the Civil War until the 1920s. Following this time most of the forestland was converted for other uses. A freshly cut forest had few trees remaining, which made it difficult for humans and wildlife. Forest animal populations began to decline and some of the animals, such as the passenger pigeon and Carolina parakeet, became **extinct**.

Some forested areas became new towns and cities. Other forests were plowed for farmland, but crops failed in the regions with rocky soils. To keep areas open for grazing livestock, fires were set to kill woody vegetation. So few trees remained that sawmills and timber cutters went out of business or moved to other regions.

After several decades of growth and **conservation**, we can again harvest the forests and gain benefits from the trees. More landowners now consider the future of forests. Replanting and **forest management** practices will ensure the forests will be used for many generations of humans and wildlife.

See the activity sheet, "Forest Explorers," on page 7. Make copies for students and ask them to complete the activity. Discuss the explorers shown. What kinds of forests would they have seen?

POST-DISCUSSION QUESTIONS

1. How were Missouri's forests used?

people did not think of the future and cut all the trees—the nation was growing and trees were needed for railroad ties, lumber for homes; also trees were cut to clear space for homes, cities and farms

2. What can be done to manage a forest?
- don't cut all of the trees at once; replant new trees where needed

Forest Plants and Animals

1. Bobcat

Size: 57-127 cm (22 1/2-50") long
Compared to a domestic cat, bobcats are larger with longer legs, spotted fur and a short tail. Bobcats live in forests, making dens on ledges or under logs. They prey mostly on rabbits, but some squirrels, turkeys and deer.

2. Fox Squirrel

Size: 48-73 cm (19-29") long
Fox squirrels look like gray squirrels, but are larger and a reddish color. They make dens in tree cavities, where they raise 2-3 young per litter. Squirrels eat acorns, pecans, hickory nuts, walnuts and mulberries, but also eat buds in spring. They bury nuts, then locate them from memory and smell.

3. White-tailed Deer

Size: 137-198 cm (54-78") long
Deer prefer forests and woods near streams. They eat nuts, grass, twigs and other plants. Fawns, usually twins, are born in May and June and stay in the place where they were born for a month, then move to feed with their mother.

4. Woodland Vole

Size: 82-146 mm (3-5 3/4") long
Voles look like chunky mice, with a large head, tiny ears, short feet and stubby tail. They live underground in oak forests, making tunnels in the soil and under leaves, using their stout heads to the push soil out. They eat plants, berries and seeds.

5. Wild Turkey

Size: 94-117 cm (37-46") long
Birds of the open forest, turkeys feed on seeds, nuts, acorns and insects. They roost in trees at night. Hens build a nest with 10-12 eggs on the ground in April and May. Chicks hatch in 27 days and roost under the hen for a month.



6. White-breasted Nuthatch

Size: 15 cm (5 3/4")
Nuthatches, acrobats of the forest, crawl over tree trunks to find insects

and spiders. They nest in tree cavities, laying 5-8 eggs that hatch in 12 days.

7. Great-horned Owl

Size: 56 cm (22")
Great-horned owls are the large owls with ears, found in forests and city parks. Their call is *who-who-who-who*, heard at dusk in Jan. and Feb. when the birds begin nesting. They lay 2-3 eggs in an old hawk nest or tree cavity. Their diet is mostly mice and rabbits.

8. Pileated Woodpecker

Size: 42 cm (16 1/2") long
A woodpecker of mature forests, they are shy and seldom seen. Their call is *loud, wuck-a-wuck-a-wuck-a*, but also listen for loud hammering as they search for ants in dead trees or dig out a cavity for a nest.

9. Ovenbird

Size: 15 cm (6") long
The ovenbird, a warbler of mature forests, has a song that's easy to remember: *teacher-teacher-teacher!* They hunt insects and build a nest of grasses on the forest floor. Their name is from the roof they build over the nest. The birds winter in Venezuela and Central America.

10. Gray Treefrog

Size: 32-51 mm (1 1/4-2") long
Treefrogs emerge in April and hunt for insects at night. During the day, they hide on tree bark and in hollow trees using their sticky toe pads to climb steep surfaces. Treefrogs lay eggs in woodland ponds and marshes.

11. Rough Green Snake

Size: 46-66 cm (18-26")
Rough green snakes live in the branches of trees and shrubs. Their color blends with the leaves and they even wave with the motion of the wind for camouflage. Green snakes eat insects and spiders.

12. Tiger Salamander

Size: 18-21 cm (7-8 1/4") long
In forests, tiger salamanders are found under logs and come out at night. Females lay up to 1,000 eggs in spring and the gilled larvae or mudpuppies become salamanders in fall.

13. Three-toed Box Turtle

Size: 11-14 cm (4 1/2-5 1/2") long
Box turtles feed on insects, earthworms, berries and plant shoots. They prefer the forest, where they burrow into loose soil to lay eggs, rest and overwinter.



14. Walking Stick

Size: 75 mm (3") long
Looking like twigs, walking sticks live in trees and eat leaves. The female lays about 100 eggs, dropping them to the ground to hatch the following spring.

15. Baldface Hornets

Size: 20 mm (3/4") long
Baldface hornets, named for the yellow markings on their heads, build a large, covered paper nest—some housing more than 1,000 hornets. They are social insects with drones, workers and queens.

16. Io Moth

Size: 70 mm (2 3/4") wingspan
Io moth caterpillars are yellow-green with a red and white stripe on each side and bristly, stinging spines. They spin a thin, brown silk cocoon in leaf litter.

17. Spicebush Swallowtail Caterpillar

Size: 48 mm (2") long
Caterpillars eat sassafras and spicebush leaves. When disturbed, a Y-shaped organ emerges from behind the larvae's head and a strong odor is released. The butterfly is large and black with white, teal and orange wing spots.

18. Termites

Size: 5 mm (1/4")
Termites live in colonies with distinct castes—kings and queens, workers, soldiers and nymphs. Termites digest wood with the help of protozoa living in their digestive tracts and are valuable in breaking down dead trees.

19. Carpenter Ants

Size: 12 mm (1/2") long
Carpenter ants burrow in dead wood and build large nests. They are social insects and our largest ant.

20. Sowbug

Size: 9 mm (3/8")
Sowbugs are isopods, moving quickly on seven pairs of leglike appendages. Also called pillbugs, they live in damp areas under logs and rocks, and eat dead plants and animals.

21. Centipede

Size: 48 mm (2") long
Centipedes protect themselves by stinging predators with their long front claws. Moving very quickly, they hide under logs and eat insects and other small animals. Centipedes are chilopods, with a pair of legs for each body segment.

22. Earthworm

Size: 2-15 cm (3/4-6") long
Earthworms live in moist soil, eating dead plants as they tunnel. Their burrows help aerate the earth. Earthworms are annelids, relatives of leeches.

23. Cicada Nymph

Size: 29 mm (1 1/4") long
Cicada nymphs live in the ground sucking juices from roots for 2-20 years, depending on the species. When mature, they crawl out. The adults emerge, lay eggs in twigs, the eggs hatch, fall to the ground and the young dig in again.

24. Junebug Grub

Size: 24 mm (1") long
Junebug eggs are laid in the ground and the larvae or grubs feed on roots for 2-3 years. Many birds and mammals eat the grubs. In fall, they pupate underground and beetles emerge in spring.

25. White Oak

Size: 24-30 m (80-100 ft.)
The most important hardwood lumber tree in the U.S. and Missouri, white oaks grow best on lower slopes with moist soils. Leaves have 7-9 rounded lobes.

26. Flowering Dogwood

Size: 19 m (30 ft.) tall
Flowering dogwoods, Missouri's state tree, have showy flowers in spring and red berries and leaves in fall. They grow in the understory.

27. Oak and hickory forest

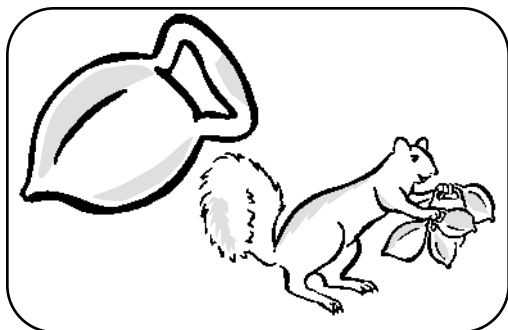
Missouri's forests are mostly black and white oaks and hickory trees.

(continued on page 11)

| | | | | | |
|------------|-------------------------|------------|------------------------|------------|-----------------------|
| 1. | Bobcat | 15. | Baldface Hornets | 28. | Redcedar |
| 2. | Fox Squirrel | 16. | Io Moth | 29. | Red Maple Seeds |
| 3. | White-tailed Deer | 17. | Spicebush Swallowtail | 30. | White Oak Acorn |
| 4. | Woodland Vole | | Caterpillar | 31. | Hickory Nut |
| 5. | Wild Turkey | 18. | Termites | 32. | Sassafras Seedling |
| 6. | White-breasted Nuthatch | 19. | Carpenter Ants | 33. | Hickory Seedling |
| 7. | Great-horned Owl | 20. | Sowbug | 34. | Virginia Creeper Vine |
| 8. | Pileated Woodpecker | 21. | Centipede | 35. | Mayapples |
| 9. | Ovenbird | 22. | Earthworm | 36. | Dutchman's Breeches |
| 10. | Gray Treefrog | 23. | Cicada Nymph | 37. | Blue Violet |
| 11. | Rough Green Snake | 24. | Junebug Grub | 38. | Mosses |
| 12. | Tiger Salamander | 25. | White Oak | 39. | Shelf Mushroom |
| 13. | Three-toed Box Turtle | 26. | Flowering Dogwood | | |
| 14. | Walking Stick | 27. | Oak and Hickory Forest | | |

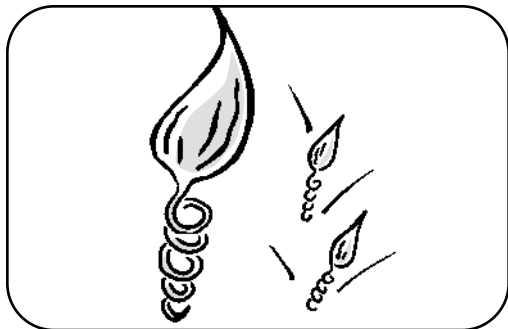
Silly Seeds

Seeds move away from trees in different ways. Complete the information about these imaginary tree seeds.



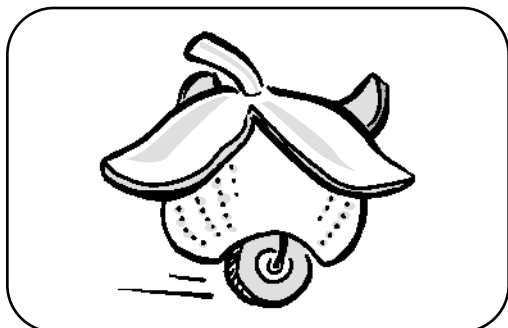
Tree name: _____

Seed moves away from tree by _____



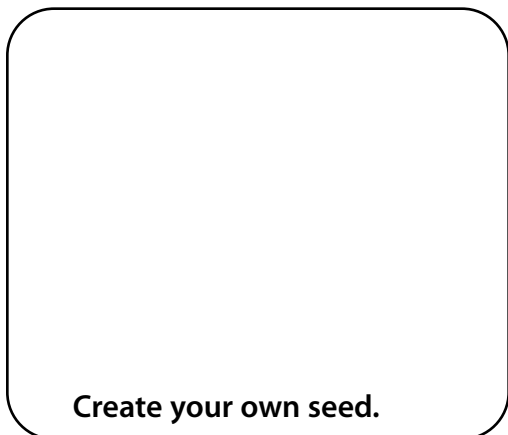
Tree name: _____

Seed moves away from tree by _____



Tree name: _____

Seed moves away from tree by _____



Create your own seed.

Tree name: _____

Seed moves away from tree by _____

Forest Explorers

An **explorer** is someone who travels to unfamiliar places to learn more about them.

Many people have explored Missouri's forests.

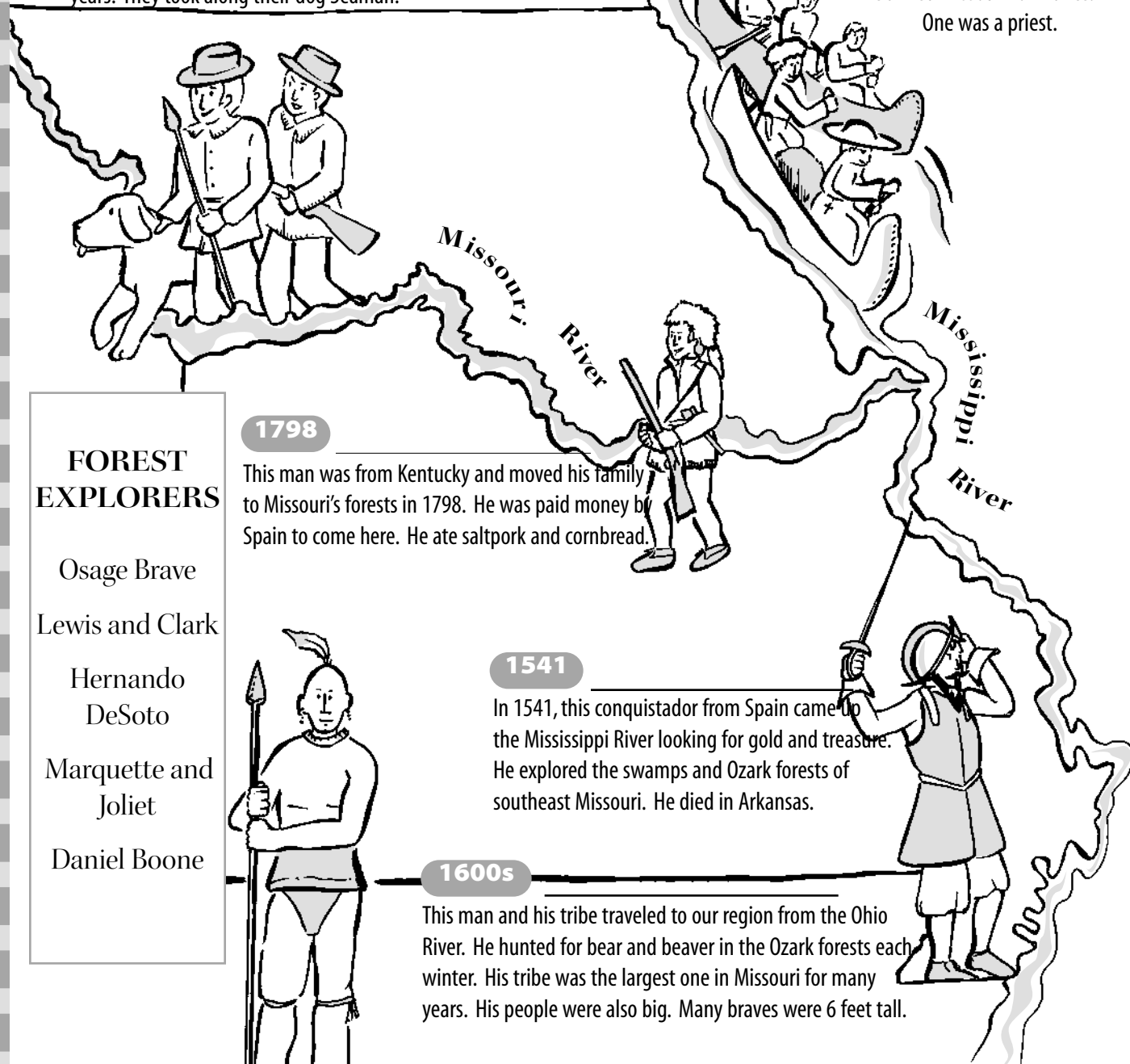
Read the clues below. Can you name these forest explorers?

1804

This pair of explorers went up the Missouri River in 1804. President Jefferson wanted them to look for a way to the Pacific Ocean and to map the new Louisiana Territory. They traveled almost 8,000 miles in three years. They took along their dog Seaman.

1673

This pair of explorers floated their two birchbark canoes down the Mississippi River in 1673. They saw bottomland forests and claimed Missouri for France. One was a priest.



FOREST EXPLORERS

Osage Brave

Lewis and Clark

Hernando
DeSoto

Marquette and
Joliet

Daniel Boone

1798

This man was from Kentucky and moved his family to Missouri's forests in 1798. He was paid money by Spain to come here. He ate salt pork and cornbread.

1541

In 1541, this conquistador from Spain came to the Mississippi River looking for gold and treasure. He explored the swamps and Ozark forests of southeast Missouri. He died in Arkansas.

1600s

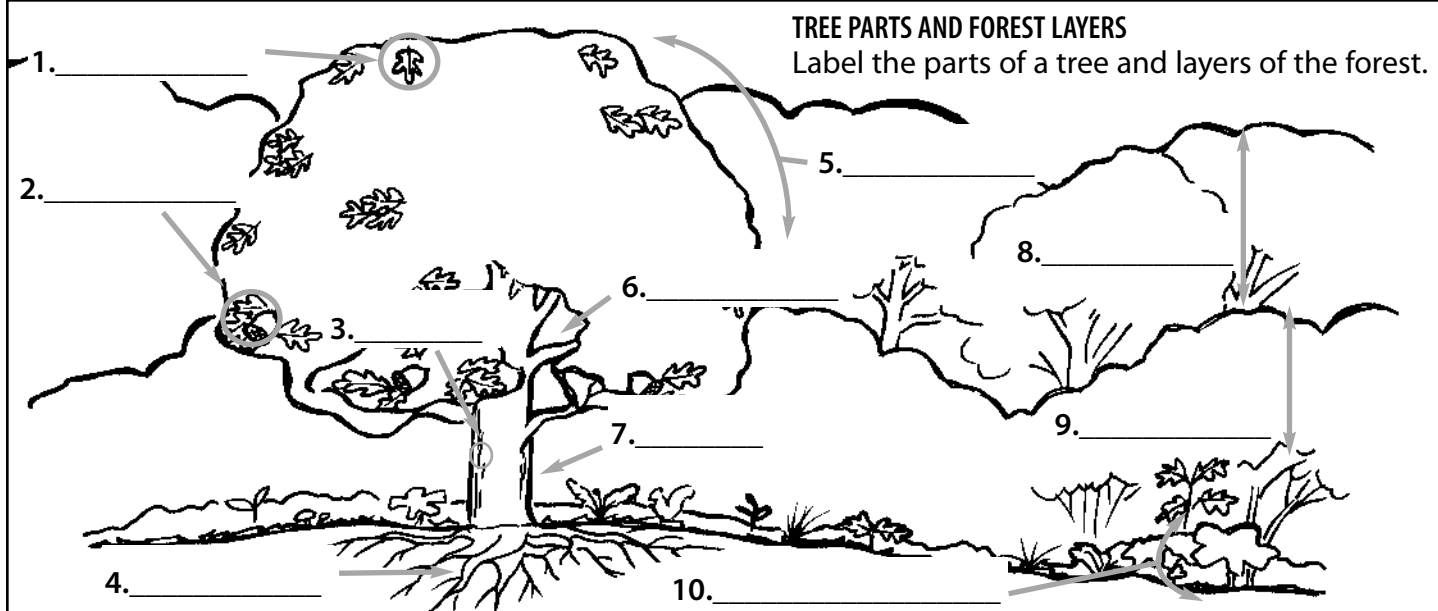
This man and his tribe traveled to our region from the Ohio River. He hunted for bear and beaver in the Ozark forests each winter. His tribe was the largest one in Missouri for many years. His people were also big. Many braves were 6 feet tall.

Now show where you live. What part of our forests would you like to explore?

ASSESSMENT Forests are renewable resources.

TREE PARTS AND FOREST LAYERS

Label the parts of a tree and layers of the forest.



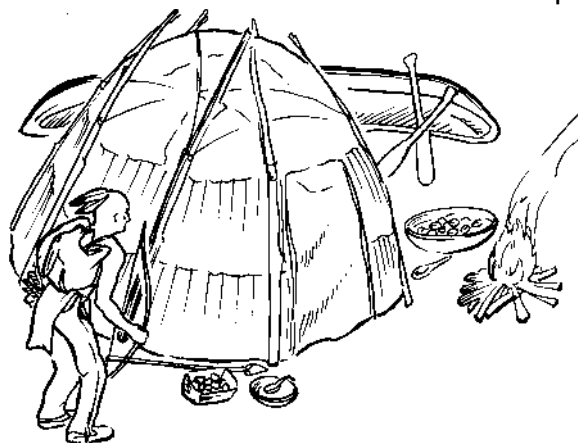
RENEWABLE RESOURCES

This woman is harvesting trees. When trees are cut, more sunlight reaches the forest floor. What will happen to this forest?

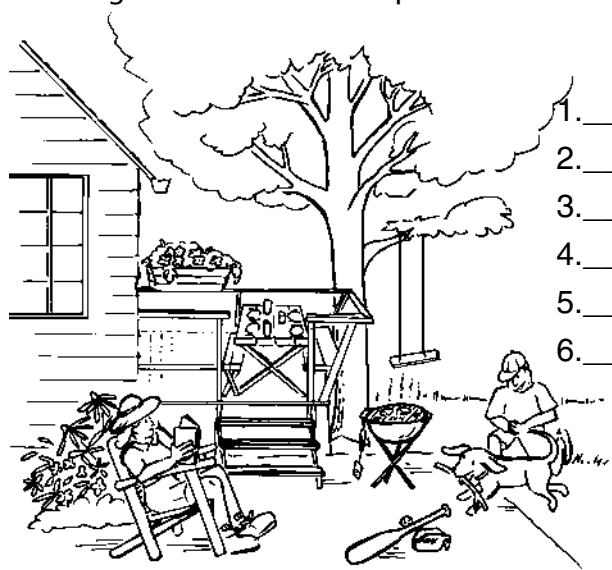


PRODUCTS OF THE FOREST

List the forest products being used in each of the pictures.



| | |
|----------|----------|
| 1. _____ | 4. _____ |
| 2. _____ | 5. _____ |
| 3. _____ | 6. _____ |



| |
|----------|
| 1. _____ |
| 2. _____ |
| 3. _____ |
| 4. _____ |
| 5. _____ |
| 6. _____ |

Forests Poster

SHOW-ME STANDARDS Performance: 1.5, 1.6, 2.3

Knowledge: CA5, SC3, SC4

VOCABULARY canopy, understory, forest floor, producers, consumers, decomposers, adapt, predator, prey, mimicry, food chain

STUDENT OBJECTIVES Students will be able to:

1. Discuss components of the forest and wildlife found there.
2. Diagram the forest layers of canopy, understory and forest floor.
3. Give examples of animals that use mimicry and camouflage to escape predators.
4. List a food chain of at least three plants or animals describing the role of each as producer, consumer or decomposer.

PRE-DISCUSSION QUESTIONS

1. Have you visited or hiked in a forest that looks similar to the one in the poster? What animals and plants did you see?
2. What is the closest forest to your home? To your school?

Jump into Forests

Ask students to open their magazines to the center poster of forest plants and animals. Also, place the *Forests Poster* up in the classroom.

There are several key concepts represented in the forest poster, including forest layers, producers-consumers-decomposers, adaptations (such as mimicry and camouflage), food chains, plant and animal identification, life cycle of a tree and seed dispersal. Several of these subjects are a review of topics already covered in the magazine, while some are new concepts to this packet.

1. Forest layers

The **canopy** is the top layer of Missouri's forests. In the canopy you will find large trees as **producers**, mainly oak and hickory trees. **Consumers** living in the trees are birds, insects and small mammals.

The **understory** is the next layer of the forest. Here, smaller trees such as dogwood, serviceberry and sassafras are producers. Also there are **shrubs** such as poison ivy, Virginia creeper and fragrant sumac and young trees. Consumers living in these trees are birds, insects, spiders, snakes, frogs and small mammals.

On the **forest floor**, wildflowers, mosses and tree seedlings are producers growing in the rich soil. Consumers living on the floor are mammals, birds, insects, turtles, snakes, lizards, salamanders, frogs and spiders. Isopods, fungi, bacteria and insects are the **decomposers** recycling the energy of the forest.



2. Adaptations

Many forest plants and animals have **adaptations** for survival.

Adaptations help them escape **predators**, catch **prey** and live in a specific environment.

Mimicry is when an organism looks like another organism that predators see as bad or dangerous. Mimicry allows an organism to catch food or escape predation. Examples in the poster are lo moth and spicebush swallowtail caterpillar. Both have eye markings that make them appear larger to scare away predators.

Camouflage is a covering that matches the environment. Camouflage allows an organism to avoid predation or not be seen by prey. Look for the rough green snake, gray treefrog, walking stick, wild turkey and chicks, bobcat, deer and ovenbird as examples.

3. Finding food chains

Pass out copies of the "Forests Poster Key," page 5. Use it to help students identify the species in the poster. They can color the forest if time allows. Descriptions of the plants and animals (pages 4 and 11) give more information for discussion and identification.

Discuss the interdependence of the forest species. Sunlight is the main source of energy in the forest. Trees are the primary producers, processing sunlight, nutrients and water into food. All organisms need energy to live. Help students find several **food chains** in the forest, such as: the turkey eats acorns, then the bobcat catches the turkey. Use the species descriptions to help you learn more about food habits and chains.

4. Tree life cycles and seed dispersal

Like other plant life cycles, trees begin as seeds, become seedlings, grow into adults and produce flowers that develop into fruits containing seeds. Locate the stages of the oak tree's life cycle in the poster.

Seeds have adaptations that ensure the tree's survival. Look in the poster for seed adaptations to include seeds that fly, seeds that are buried and seeds eaten by animals.

POST-DISCUSSION QUESTIONS

1. What are the main producers in the forest?

trees, oak and hickory **What are the consumers?**

animals **What are the decomposers?** *small insects, bacteria, fungi on the forest floor*

2. What adaptations do animals of the forest have to help them escape predators?

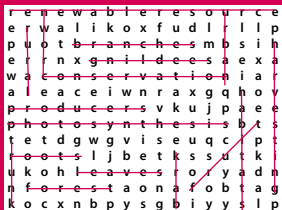
mimicry, camouflage

3. Tell about a small food chain you can find in the poster.

caterpillar eating sassafras and ovenbird eating caterpillar; turkey eating acorns and bobcat eating turkey; ant eating plant, centipede eating ant and salamander eating centipede



Woody Words



DEFINITIONS

adapt—to adjust to surroundings or living conditions

bark—the tough covering of a woody stem or root

canopy—the forest layer formed by the leaves and branches of trees

conservation—the use of natural resources in a way that assures their continuing availability to future generations

consumer—an organism that obtains energy by feeding on other organisms and their remains

crown—the top branches and leaves of a tree

deciduous—a plant that sheds all its leaves each year at a certain season (usually fall); includes most Missouri broadleaf trees, although a few conifers, such as baldcypress, are deciduous

decomposer—a plant or organism that breaks down the bodies or parts of dead plants and animals

food chain—sequence of organisms where each uses a lower member of the sequence as a food source, thus transferring energy, with the sun as the base

forest—an area of land primarily covered with trees and other woody vegetation

forest floor—the layer of decomposing material that covers the soil in a forest

forest management—the application of forestry practices so the forest produces benefits for people, such as wood, recreation and wildlife

fruit—ripened ovary of a seed-producing plant

habitat—the environment that supplies the basic life needs (food, water and shelter) of an organism

harvest—cutting that removes marketable trees and encourages new tree growth

mimicry—one species that imitates another species to protect itself

photosynthesis—the process by which green plants manufacture simple sugars and oxygen from carbon dioxide and water in the presence of sunlight and chlorophyll

predator—an animal that hunts or captures other animals for food

prey—animals that are eaten by other animals

producer—an organism that can use sunlight to make food from minerals and water

renewable resource—a naturally-occurring raw material or form of energy which has the capacity to replenish itself through ecological cycles and sound management practices; the sun, wind, falling water, wildlife and trees are examples of renewable resources

roots—the below-ground part of the tree that anchors the tree and absorbs water and nutrients from the soil

rural—pertaining to the country

seedling—a young tree grown from a seed up to a small sapling

shrub—a woody plant less than 12 feet (4m tall); usually with many stems

snag—a standing dead tree with most of the branches gone; usually home to wildlife

trunk—the main stem of the tree that provides support for the branches

understory—the layer formed by the crowns of smaller trees in a forest

urban—an area occupied by manmade structures used for residential, commercial and industrial purposes



Seasons and Trees

Read through the calendar in the magazine and discuss the topics with students. Ask students to select a kind of Missouri tree and write or draw what it looks like in each season. Include how people or other animals use it during the year.

Tree NET

The web sites in the student magazine cover many aspects of trees and tree products.

Missouri Department of Conservation

www.conservation.state.mo.us has information about places to go, forest management, tree identification and many other tree topics.

Paper University www.tappi.org/paperu has specific information on how paper is made.

The Pencil Pages! www.pencils.com has great detail of pencil manufacturing.

Smokey Bear's Web Page www.smokeybear.com covers information about forests, ethics and this popular forest spokesperson.

As a bonus, check out this site for additional forest information and some great links:

Forestry Fun for Kids www.safnet.org/about/forestryfun.html



28. Redcedar

Size: 12-18 m (40-60 ft.) tall

The redcedar, an evergreen tree, has fragrant wood used for clothes closet lining and novelties. The tree is good cover for wildlife and many animals eat their small, blue berries.

29. Red Maple Seeds

Size: 2.5 cm (1") long

Trees are usually found in wet bottomlands, but winged seeds disperse away from tree with the wind.

30. White Oak Acorn

Size: 1-3 cm (3/8-1 1/4") long

Acorns have a warty cup and shiny, brown nut. Nuts are a favorite of squirrels and other animals.

31. Hickory Nut

Size: 3-6 cm (1 1/4-2 1/2") long

Hickory nuts are covered with a brown hull that splits apart in four sections.

32. Sassafras Seedling

Sassafras is one of the first trees to grow in cleared areas of central and south Missouri.

33. Hickory Seedling

Squirrels eat and help plant hickory nuts in fall. New trees also sprout from stumps.

34. Virginia Creeper Vine

Virginia creeper is often confused with poison ivy, although Virginia creeper has five leaflets instead of three. Many birds enjoy the vine's berries in fall and winter.

35. Mayapples

Size: 45 cm (18")

Mayapples grow in open woods. Their sweet fruit ripens in early summer.

36. Dutchman's Breeches

Size: 16-30 cm (6-12")

Look in rich woods for this wildflower resembling a clothesline strung with white bloomers.

37. Blue Violet

Size: 12-15 cm (4 3/4-6")

Blue violets grow in rich forests. Watch for clumps of their heart-shaped leaves.

38. Mosses

Size: less than 20 mm (3/4")

Mosses grow in a cushion, low to the ground. They do not flower, but have tiny stalks to hold and spread spores.

39. Shelf Mushroom

Size: 5-9 cm (2-3 1/2")

Like all mushrooms, this is a fungus that grows in the wood or underground. The mushroom is the fleshy part that appears above ground to spread spores for new fungi to grow. The fungus decomposes dead wood and plants.

**SHOW ME STANDARDS**

Performance: 1.5, 2.3, 3.1, 4.1, 4.3

Knowledge: SC8, CA6

Ask students to circle the things in the picture that are wrong. Ask them to write down what they have circled and why people shouldn't do each. Answers should include:

Picking wildflowers does not let others enjoy the flowers and keeps the plants from producing seeds.

Littering is ugly, spoils the outdoors for others and can be harmful to plants and animals.

Carving initials in a tree hurts the tree's trunk and makes it open to disease and insects.

Feeding wild animals is dangerous for you (the animal could bite or carry diseases and parasites) and dangerous for the animal (it may lose its fear of predators).

Unwatched fires can quickly escape and destroy trees, wildlife, homes and other property.

Breaking branches off trees for firewood destroys the tree. You should only use firewood you have brought to the campsite with you or branches found on the ground.

EXTENSIONS

To better understand good ethics when hiking, camping or using the forest, here are two scenarios of forest activities. Split the class up into 4 or 5 groups and ask each group to decide what they would do in one or both of these cases and why.

1. You and your family are hiking in a forest at a nature center. You see a squirrel caught in a plastic grocery bag. It is tangled and can't escape. What would you do? How could you keep this from happening again?

2. You are hiking on a forest trail near a campground. You and your family see a camp set up and a campfire is burning. No one is near the camp. It looks abandoned. What would you do?

Ask students if they have had similar experiences. Let them write down their dilemma and discuss it with the class.

Point of View

Discuss the views in the magazine and ask students if they know of a dead tree nearby. Should the tree be cut down? Why? Why not? Explain to students that both options are good, but the location and possible uses should be considered.

Key

Crown

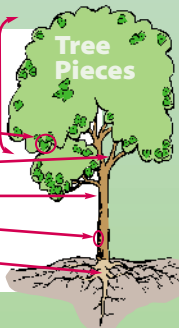
Leaf

Branch

Trunk

Bark

Root

Tree Pieces

Getting involved in FORESTRY

You and your class can explore forestry as a career by talking to a local forester or contacting a nearby university with a forestry program. Here's a website to help understand the profession, too.

Learn About Forestry
www.safnet.org/about/index.html

Become a Forestkeeper

Missouri Forestkeepers is a program to help you get involved in forest conservation.

As a Forestkeeper, you can monitor tree health in your neighborhood or forest, conduct insect and disease surveys or educate the public about healthy forests.

For more information on how to get your class involved with Missouri Forestkeepers, contact the

Missouri Forestkeepers Network

at 4207 Lindell Blvd., Suite 120, St. Louis, MO 63108
 or phone (888)936-7378.



FOREST FIELD TRIPS

The Missouri Department of Conservation, along with partner agencies and organizations, provides many opportunities for Missourians to enjoy forest recreation. Take a look at the *Missouri Outdoor Map* enclosed in this packet for a local forest or visit one of these nature centers.

Burr Oak Woods
Conservation Nature Center
 Blue Springs, Mo.
 (816) 228-3766

Powder Valley Conservation Nature Center
 Kirkwood, Mo.
 (314) 301-1500

Rockwoods Reservation
 Glencoe, Mo.
 (636) 458-2236

Runge Conservation Nature Center
 Jefferson City, Mo.
 (573) 522-4312

Springfield Conservation Nature Center
 Springfield, Mo.
 (417) 888-4237



ASSESSMENT Activity Key

To help the class review your unit on Forests, an assessment activity is included on page 8. See answers below.

TREE PARTS AND FOREST LAYERS

1 leaf 2 fruit or nut 3 bark 4 roots 5 crown 6 branch
 7 trunk 8 canopy 9 understorey 10 forest floor

RENEWABLE RESOURCES

Acceptable answers should display understanding of one or more of these concepts.

*Growing room is provided for new trees.
 Remaining tree stumps will decompose
 and return nutrients to the soil.*

*Saplings or sprouts from stump will
 grow quickly in full sunlight.*

*Open area allows more browsing or
 young trees for wildlife food.*

PRODUCTS OF THE FOREST

Six each of the following answers could be used:

Native American Camp

Firewood, lodge or house, canoe, paddle, spear, bow, arrows, bowl, spoon or dipper, foods (fruit, nuts)

Missouri Home

House, deck, paint or varnish, picnic table, book, baseball bat, chair, planter, charcoal in grill, tree swing

Equal opportunity to participate in and benefit from programs of the Missouri Department of Conservation is available to all individuals without regard to their race, color, national origin, sex, age or disability. Complaints of discrimination should be sent to the Department of Conservation, P.O. Box 180, Jefferson City, MO 65102, OR U.S. Fish & Wildlife Service, 18th and "C" Streets NW, Washington D.C. 20240, Missouri Relay Center - 1-800-735-2966 (TDD).